ENGINEERING TEST REPORT
NUMBER: 10215290EUS1

ON
Model No.(s):
MB-PRO-MVK, MCU-430F5438A-MVK, AFE-BREAKOUT-MVK,
RF-BREAKOUT-MVK, & RF-TCA8418-MVK

IN ACCORDANCE WITH:
CFR 47, PART 15, SUBPART B,
CLASS B VERIFICATION

TESTED FOR:
Texas Instruments, Inc.
12500 TI Boulevard, M/S 8669
Dallas TX, 75243

TESTED BY:
Nemko USA, Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

Total Number of Pages: 22

APPROVED BY: _____ DATE: 3-Nov-2011
Art Ruvalcaba EMC Engineer

TESTED BY: _____ DATE: 19-Oct-2011
Brian Boyea, EMC Engineer

NVLAP Lab Code 100426-0

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Section 1. Summary of Test Results

General:

All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with CFR 47, Part 15, Subpart B for Class B Digital Devices.

These tests were conducted using measurement procedures of ANSI C63.4-2003.

The equipment was tested for conducted emissions from 0.150 MHz to 30 MHz using a 50 microhenry line impedance stabilization network (L.I.S.N.) as described in ANSI C63.4-2003. Peripheral equipment was also operated through a 50 microhenry L.I.S.N.

The equipment was tested for radiated emissions from 30 MHz to 1000 MHz in accordance with the requirements of CFR 47, Part 15, Subpart B. Equipment with oscillator frequencies above 108 MHz were tested to the fifth harmonic or in accordance with the requirements of CFR 47, Part 15.33.
Frequencies were initially identified in a semi-anechoic chamber. Amplitude measurements were made in a semi-anechoic chamber. Details of the chamber are on file with the FCC and Industry Canada.

Abstract:

Name of Test	Basic Standard	Results
Conducted Emissions (Mains port)	CFR 47, Part 15, Subpart B Para. No. 15.107	Complies
Radiated Emissions	CFR 47, Part 15, Subpart B Para. No. 15.109	Complies

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE: **NONE**

Section 2. Equipment Under Test (E.U.T.)

Manufacturer:	Texas Instruments, Inc.
Name:	Development Evaluation Modules
Model Number:	MB-PRO-MVK, MCU-430F5438A-MVK, AFE-BREAKOUT-MVK, RF-BREAKOUT-MVK, & RF-TCA8418-MVK
Serial Number:	None
Part Number:	MB-PRO-MVK, MCU-430F5438A-MVK, AFE-BREAKOUT-MVK, RF-BREAKOUT-MVK, & RF-TCA8418-MVK
Production Status:	Production
E.U.T. Arrival Date:	10/19/11

Description of E.U.T.:
Development Evaluation Modules

Clock, Oscillator, Highest Frequencies Utilized:

25.0 MHz

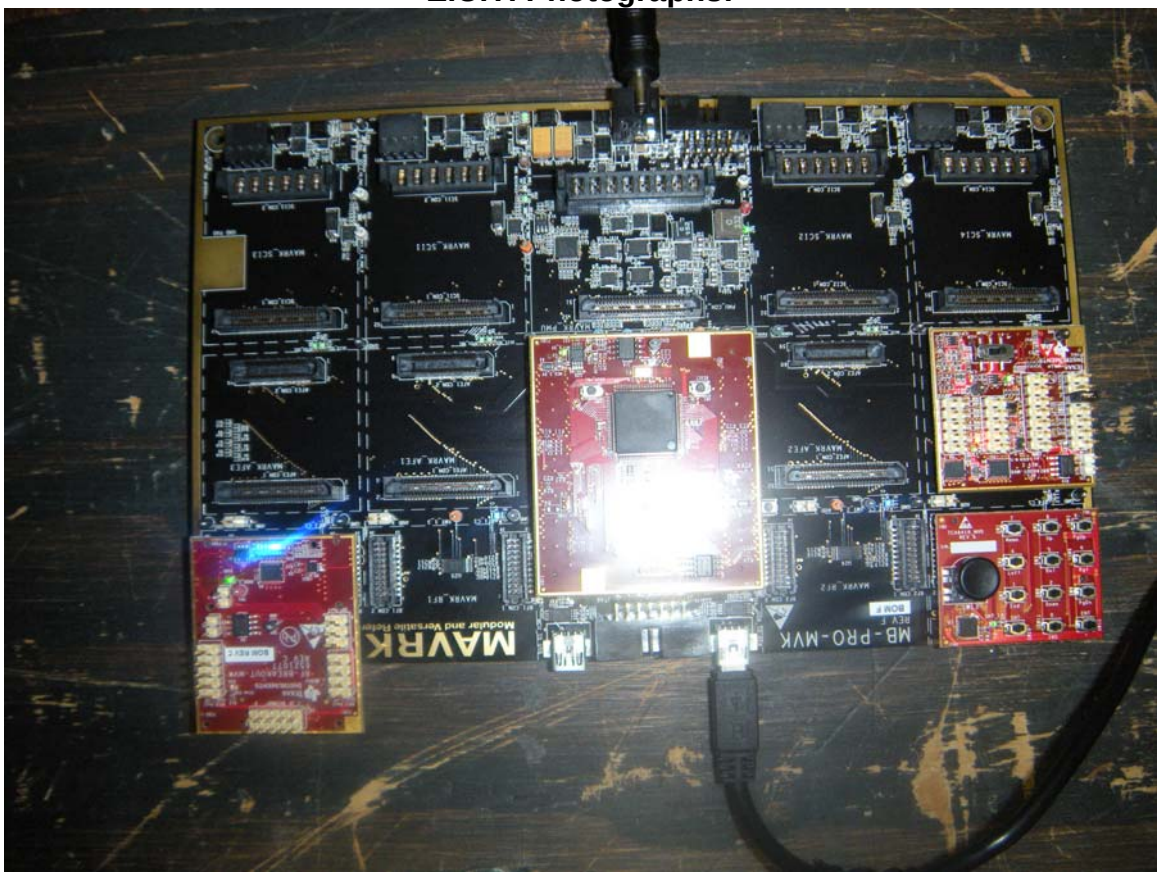
Justification:
The E.U.T. was configured for testing as per typical installation. Position and bundling of cables were investigated to establish maximum amplitude of emissions.

Exercise Program:
The E.U.T. exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

The EUT was in the following exercise mode:

Powered on running.

E.U.T. Photographs:



Section 3. Equipment Configuration

Date: 10/19/2011

NEMKO USE ONLY	
JOB #	10215290

Company: T.I.

EQUIPMENT CONFIGURATION LIST (HARDWARE/PERIPHERALS):

Place an "*" next to EUT and any item that is part of the EUT.

Item	*	Generic Description	Manufacturer	Model No.	Serial #	Rev.	FCC ID Status[1]
(A)	*	Evaluation Module	T.I.	TMDSDOCK28027			
(B)		Laptop	Dell	Latitude D610	20618812117		
(C)		PowerSupply	Dell	HA65NS0-00			
(D)							
(E)							
(F)							
(G)							
(H)							
(I)							
(J)							
(K)							
(L)							
(M)							

[1] FCC ID STATUS

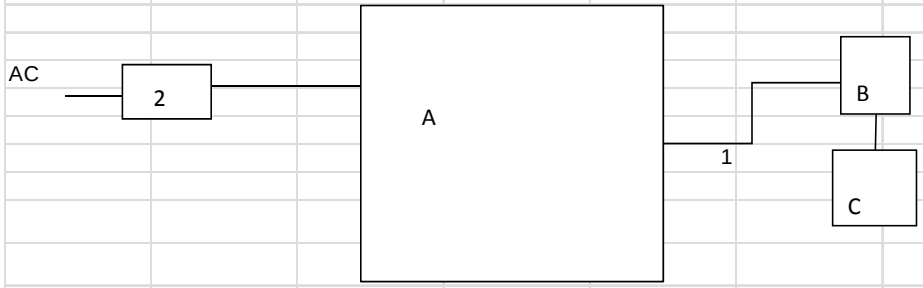
1. FCC DOC
2. FCC A/B Verification
3. None - (If performing FCC testing, contact lab manager)
4. Certification (include FCC ID in parenthesis)

INTER-CONNECTION CABLES:

Place an "*" next to EUT and any item that is part of the EUT.

Item	*	Cable Type	Manufacturer	Ln (m)	Term[2]	Shield	Qty.
(1)	*	USB	Generic	1			1
(2)	*	Power Supply	T.I. EVM TMDSDOCK28343	1			1
(3)							

Client Name:	T.I.	Work Order #:	**10215290**
Model Number:		Date:	**10/196/11**
Test Configuration:	Powered on Transmitting		



Section 4. Conducted Emissions (Mains ports)

Purpose:

The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits for conducted disturbance as defined by CFR 47, Part 15, Subpart B, Class B, Paragraph Number 15.107.

Specification Limits:

Limits for conducted disturbance at the mains ports

Frequency Range (MHz)	Quasi-peak Limits (dBuV)	Average Limits (dBuV)
0.15 to 0.50	66-56	56-46
0.50 to 5.00	56	46
5.00 to 30.00	60	50

Method of Measurement (Procedure ANSI C63.4-2003):

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak detector. Any emissions that are close to the limit are measured using a test receiver with 9 or 10 kHz bandwidth, CISPR Quasi-Peak detector.

See Sections 7 and 8.

Test #**:** CEPV-01

Tested By**:** Brian Boyea

Date of Tests**:** 10/19/11

Test Conditions**:**

Test Voltage: 120 Vac

Temperature: 25˚C

Humidity: 45%

Test Results:

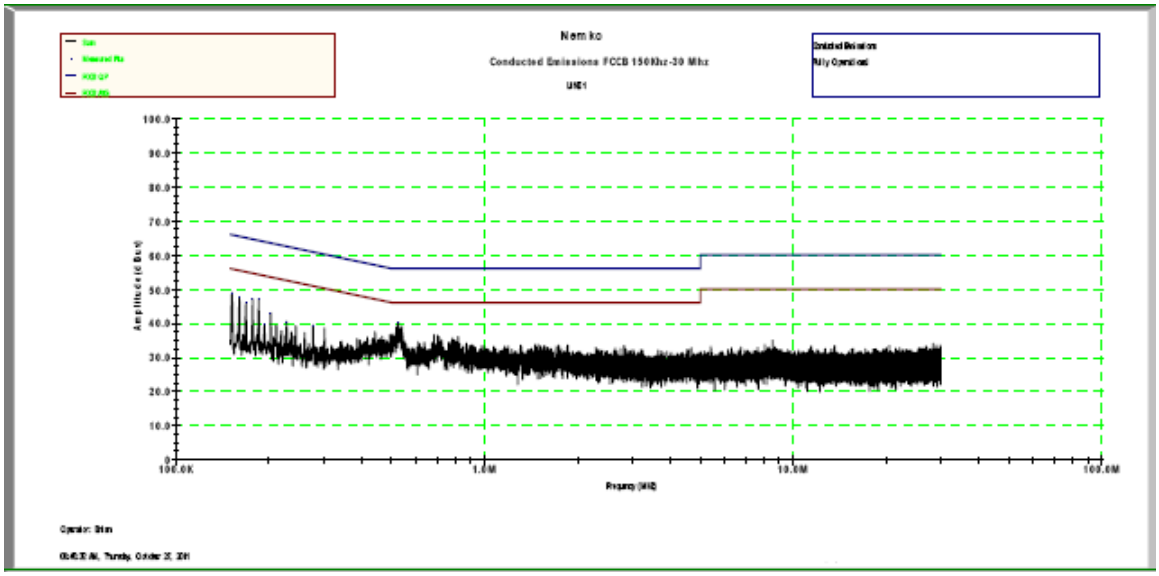
The E.U.T. complies.

TEST EQUIPMENT

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
674	Limiter	Hewlett Packard	11947A	3107A02200	26-Oct-2010	26-Oct-2011
704	Filter, High Pass, 5KHz	Solar Electronics	7930-5.0	933126	29-Sep-2010	29-Sep-2011
749	0.5m Cable Assy	Nemko USA	RG213		25-Feb-2011	25-Feb-2012
1258	LISN .15mhz-30mhz	EMCO	3825/2	1305	25-Oct-2010	25-Oct-2011
1663	Spectrum Analyzer	Rohde & Schwartz	FSP3	100073	2-Sept-2011	2-Sept-2013
1988	Cable, Coaxial	Nemko USA, Inc.			03-Nov-2010	03-Nov-2011

Test Data –Conducted Emissions, Power Lines Test#CEPV-01

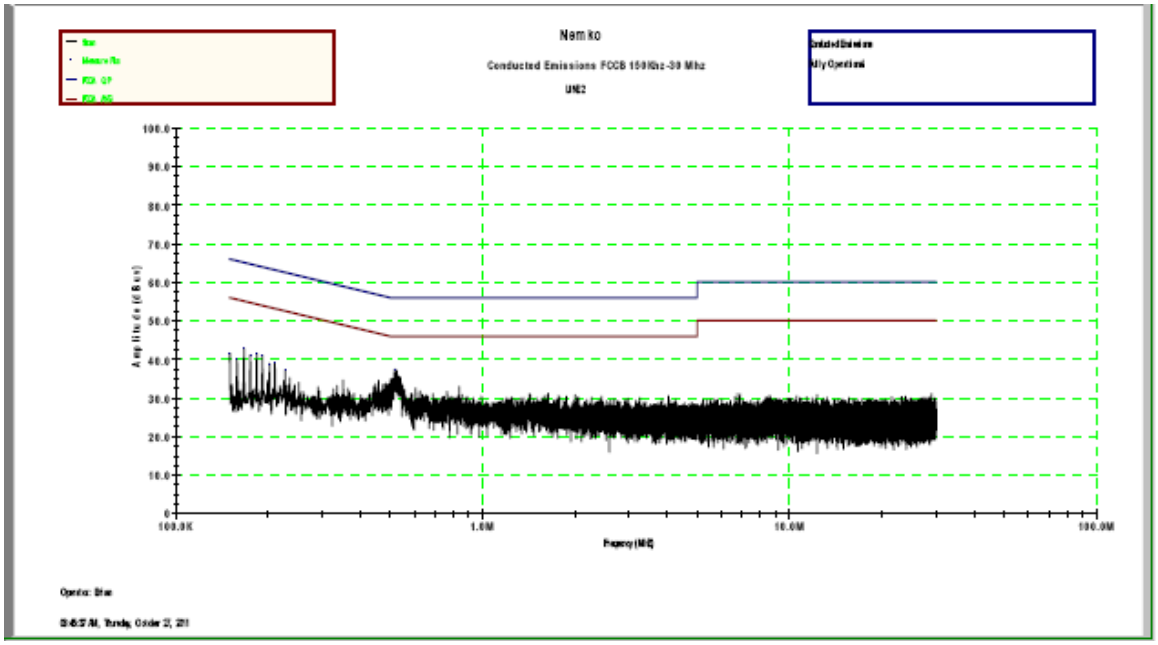
Line 1



Nemko
FCC B Conducted Emissions
Line 1 Peaks
Operator: Brian

Frequency	Peaks	FCC B AVG	FCC B QP	Avg	QP
MHz		Limit	Limit	Margin	Margin
0.152	48.90	55.95	65.95	-7.05	-17.05
0.161	47.48	55.70	65.70	-8.22	-18.22
0.169	45.99	55.47	65.47	-9.48	-19.48
0.177	46.88	55.22	65.22	-8.34	-18.34
0.185	47.09	54.99	64.99	-7.89	-17.89
0.194	39.50	54.76	64.76	-15.25	-25.25
0.203	42.96	54.49	64.49	-11.53	-21.53
0.228	40.49	53.76	63.76	-13.27	-23.27
0.278	39.39	52.34	62.34	-12.95	-22.95
0.525	40.19	46.00	56.00	-5.81	-15.81

Line 2



FCC B Conducted Emissions
Nemko
Line 2 Peaks
Operator: Brian

Frequency	Peaks	FCC B AVG	FCC B QP	Avg	QP
MHz		Limit	Limit	Margin	Margin
0.151	41.55	55.98	65.98	-14.43	-24.43
0.159	39.94	55.75	65.75	-15.81	-25.81
0.167	42.85	55.50	65.50	-12.65	-22.65
0.175	41.13	55.27	65.27	-14.15	-24.15
0.184	41.57	55.02	65.02	-13.46	-23.46
0.192	40.99	54.79	64.79	-13.80	-23.80
0.203	38.92	54.49	64.49	-15.57	-25.57
0.211	39.14	54.26	64.26	-15.12	-25.12
0.228	37.26	53.78	63.78	-16.52	-26.52
0.517	37.38	46.00	56.00	-8.62	-18.62

Conducted Emissions
Fully Operational

Test Photographs - Test # CEPV-01

Section 5. Radiated Emissions

Purpose:

The tests are intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits for radiated emissions as defined by CFR 47, Part 15, Subpart B, Class B, Paragraph Number 15.109.

Specification Limits:

Limits for radiated disturbance of Class B

Frequency Range (MHz)	3m Limits (dBuV)	10m Limits (dBuV)
30-230	40.0	30.0
230-1000	47.0	37.0

Method of Measurement (Procedure ANSI C63.4-2003):

The equipment was prescanned in a semi-anechoic chamber using a spectrum analyzer and broadband antenna. A list of frequencies was compiled for investigation in the semi-anechoic chamber. The bandwidth was set to 100 kHz and the detector function was CISPR Quasi-Peak.

Any emissions above 1 GHz were measured with a horn antenna and low noise pre-amplifier at a distance of 3 meters.

See Sections 7 and 8.

Test #**:** REHE-01

Tested By**:** Brian Boyea

Date of Tests**:** 10/19/11

Test Conditions**:**

Test Voltage: 120 Vac

Temperature: 25˚C

Humidity: 45%

Test Results:

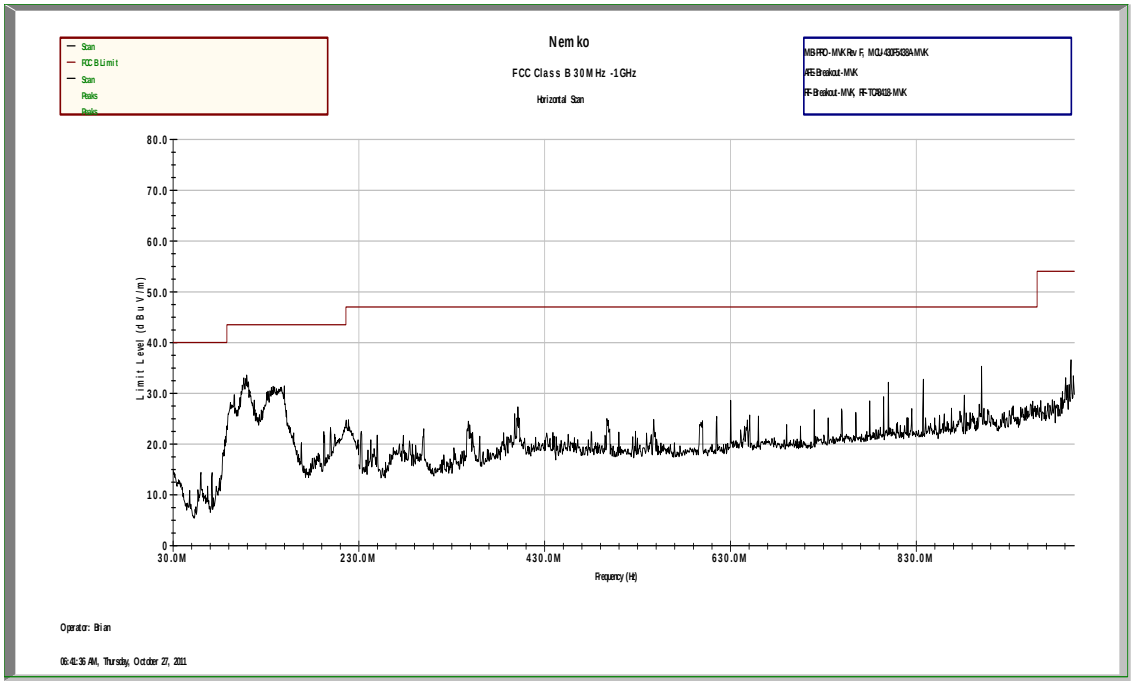
The E.U.T. complies.

TEST EQUIPMENT

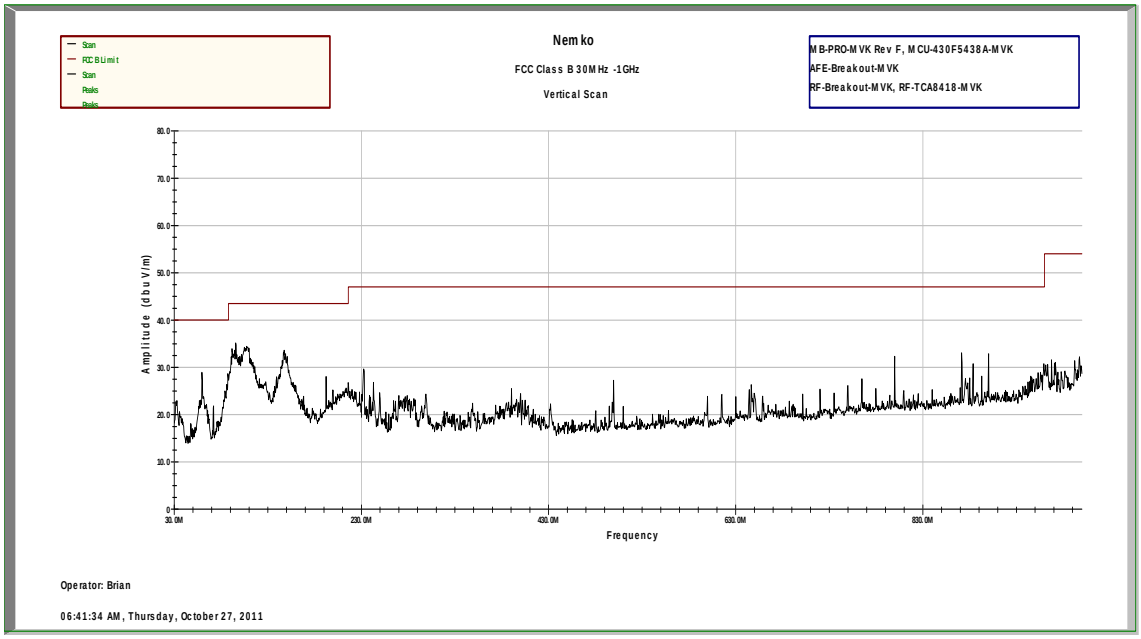
Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
1	3m Semi-Anechoic Chamber	Nemko USA, Inc.	Chamber	1	26-Sept-2011	26-Sept-2012
1016	Preamplifier	Hewlett Packard	8449A	2749A00159	20-July-2011	20-July-2012
1025	Preamplifier, 25dB	Nemko USA, Inc.	LNA25	399	23-Feb-2011	23-Feb-2012
1304	Antenna, Horn	Electro Metrics	RGA-60	6151	24-Nov-2010	24-Nov-2012
1763	Antenna, Bilog	Schaffner	CBL 6111D	22926	11-Feb-2011	11-Feb-2012
1767	Receiver, EMI Test 20Hz - 26.5 GHz - 150 - +30 dBm LCD	Rohde & Schwartz	ESIB26	837491/0002	01-Dec-2010	01-Dec-2011
1783	Cable Assy, 3m Chamber	Nemko	Chamber		26-Sept-2011	26-Sept-2012

Test Data –Radiated Emissions, Electric Field, Test#REHE-01

Horizontal



Vertical



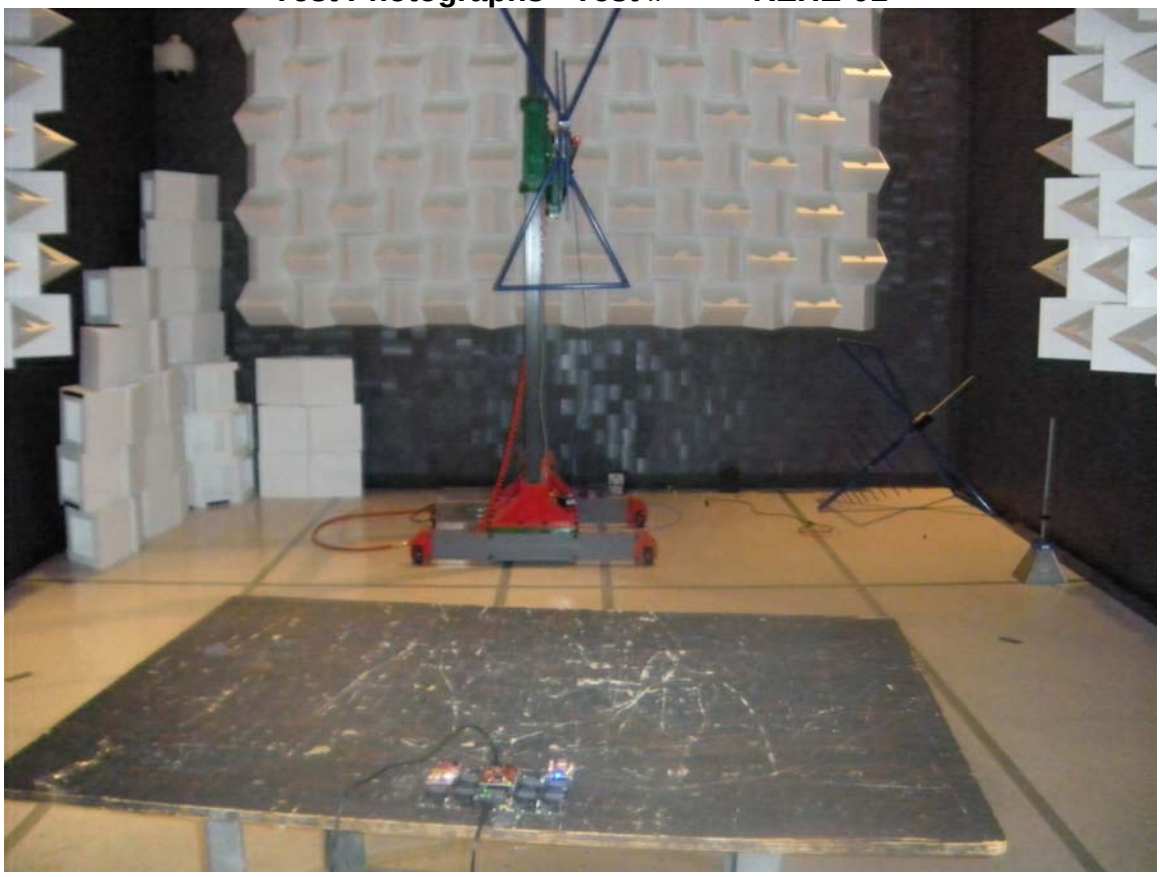
Nemko, Lewisville, TX
FCC 3 Meter Chamber
Final Quasi Peak Measurements
Operator: Brian

Frequency MHz	Limit	Horizontal QP	QP Margin	Vertical QP	Vertical Margin
60.00	40.00			24.84	-15.16
96.01	43.50			32.06	-11.44
108.86	43.50	30.76	-12.75		
147.78	43.50			30.99	-12.51
218.76	47.00	17.22	-29.79		
232.67	47.00			28.68	-18.32
400.96	47.00	13.34	-33.66		
500.03	47.00			20.13	-26.87
800.01	47.00	31.70	-15.30	27.77	-19.23
837.86	47.00	15.48	-31.52		
871.63	47.00			27.52	-19.48
899.95	47.00			29.96	-17.04
900.01	47.00	34.24	-12.76		
996.38	54.00	26.33	-27.67		

MB-PRO-MVK Rev F, MCU-430F5438A-MVK,
AFE-Breakout-MVK, RF-Breakout-MVK, RF-TCA8418-MVK

30 MHz to 1GHz was the spectrum searched.
RBW = 120kHz
VBW = 120kHz

Test Photographs - Test # REHE-01



Section 6. Microwave Radiated Emissions

N/A The EUT has no clocks above 108MHz.

Purpose:

The tests are intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits for radiated emissions as defined by CFR 47, Part 15, Subpart B, Class B, Paragraph Number 15.109.

Specification Limits:

Limits for radiated disturbance of Class B

Frequency Range (MHz)	3m Limits (dBuV)	10m Limits (dBuV)
Above 960	50	40

Method of Measurement (Procedure ANSI C63.4-2003):

The equipment was prescanned in a semi-anechoic chamber using a spectrum analyzer and horn antenna. A list of frequencies was compiled for investigation in the semi-anechoic chamber with an average detector.

Any emissions above 1 GHz were measured with a horn antenna and low noise pre-amplifier at a distance of 3 meters. The bandwidth was set to 1 MHz and the detector function was average.

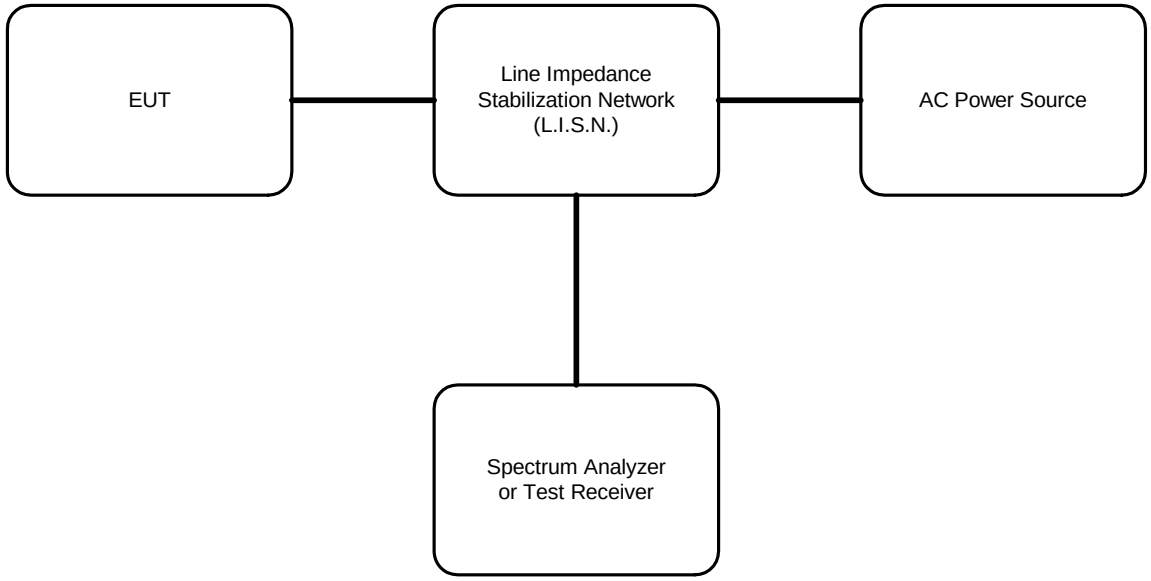
See Sections 7 and 8.

Section 7. Test Methods and Block Diagrams.

Conducted Emissions (Mains Ports)

- Applicable Test Standard: CFR 47, FCC Pt 15, Subpart B
- The test set-up is as per the test configuration diagram.
- The E.U.T. is configured as typically used.
- The E.U.T. and any accessories are operated with typical load conditions.
- Conducted power line measurements are made from 150 kHz to 30 MHz.
- For each current carrying conductor of each power cord associated with the E.U.T., the emission closest to the limit is recorded.
- Initial measurements are made using a spectrum analyzer with 10 kHz RBW, peak detector. If emissions are below the Average limit, the unit is deemed to be compliant.
- Any emissions within 6dB of the quasi peak limit are measured using a test receiver with 9 kHz bandwidth, CISPR quasi-peak detector.
- Bandwidths used on the test receiver are those specified in CISPR 16-1.

Test Configuration - Power line Conducted Emissions:



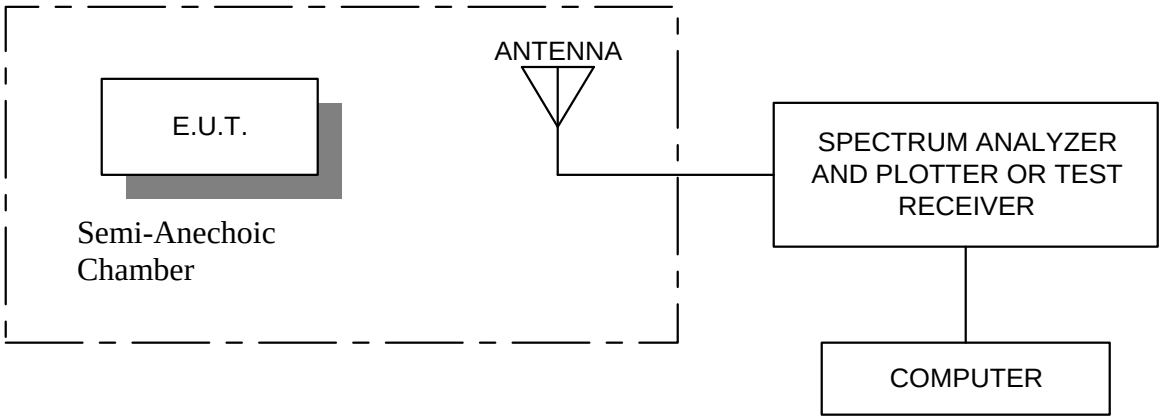
Radiated Emissions

Test Method - Radiated Emissions:

- Applicable Test Standard: CFR47, FCC Pt 15, Subpart B
- The test set-up in the shielded room is as per the test configuration diagram.
- The E.U.T. is configured as typically used.
- The E.U.T. and any accessories are operated with typical load conditions.
- Radiated emissions measurements are made from 30 MHz to 1000 MHz.
- The equipment was prescanned in the semi-anechoic chamber using a spectrum analyzer and broadband antenna to produce a list of frequencies.
- Variations in antenna height, antenna polarization, and E.U.T. azimuth are explored to produce the emission that has the highest amplitude relative to the limit.
- The frequencies noted in the preliminary test are investigated on the semi-anechoic chamber where amplitude measurements are made.
- Any emissions above 1 GHz are measured using a horn antenna and low noise pre-amplifier at a distance of 3 meters. The bandwidth was set to 1 MHz and the detector function was average.

Test Configuration - Radiated Emissions:

Radiated Pre-scan:



Section 8. Labeling Requirements

Your product has successfully complied with 47 CFR FCC Part 15.B Class B requirements.

FCC Class B Label:

This device has been tested and Verified to comply with Part 15, Class B, of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

In addition to placing the above label on your product, the three items that are required to be included in your product's manual are:

(1) For a Class B Verified device, the instructions furnished to the user shall include the following or similar statement, placed in a prominent location at the front of the manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

(2) The user's manual must caution the user that changes or modifications not expressly approved by the party responsible for compliance (you/your company) could void the user's authority to operate the equipment.

(3) In addition, the instruction manual must include appropriate instructions on the first page of the manual concerning installation of the device or special accessories (special cabling, shields, adapters) that must be used with the device. An appropriate caution statement should warn the user to utilize the special accessories supplied with the equipment for continued FCC compliance.